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***Rachel U. Lee
Scott C. Parrish
Omar Saeed
Joyce P. Fiedler***



Naval Health Research Center

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***Naval Health Research Center
140 Sylvester Road
San Diego, California 92106-3521***

Combat Internist: The Internal Medicine Experience in a Combat Hospital in Afghanistan

LCDR Rachel U. Lee, MC USN; Lcdr Scott C. Parrish, MC USN†; Lcdr Omar Saeed, MC USN‡; Col Joyce P. Fiedler, USAF MC§*

ABSTRACT Military internists and internal medicine subspecialists are physicians who generally work in traditional internal medicine settings. However, when deployed to combat settings, they must prepare and adapt their skills for a wide spectrum of complex, polytrauma, and multinational patients. There are limitations in personnel, equipment, and technical resources that make the circumstances complex and demanding. This article highlights some of the unique roles, challenges, and experiences of four military internists at the NATO Role 3, a deployed combat hospital in Afghanistan.

INTRODUCTION

In the conflict in Afghanistan, Operation Enduring Freedom (OEF), improved survival has been a result of advances in technology and medical care. Casualty care is initiated at the point of injury and then transported to higher levels, referenced by military terms, Role 1 through 5 (Table I).¹ The Role 1 is the field care provided initially; they are then transported to a Role 2 or 3 where there are surgical capabilities. Transport is usually by helicopter and depends on present conflict activities, available assets, weather, and terrain. Once stabilized, most patients are transported to a Role 3 where medevac out of the combat zone is achievable. For U.S. and most coalition patients, the next stop is the Craig Joint Theater Hospital (a Role 3 facility) in Bagram, Afghanistan, where they are assessed en route to the Role 4, Landstuhl Regional Medical Center (LRMC) in Germany. At LRMC, further evaluation and treatment take place. The last stop for a U.S. military patient is a Role 5, located in medical centers in the United States for definitive care and rehabilitation.

Military internists are often called to fill areas of need in a variety of settings. Typically in the United States, internists care for older patients and those with complex or very specialized medical problems, relying on advanced diagnostic laboratory and radiologic modalities. In combat deployed situations, they must adapt their skills to unique populations with limited resources and respond to scenarios outside the scope of their training and experience. The main goal of this article is to provide historical perspective on the internal medicine experience in OEF by give future deployers a

snapshot of what to possibly expect when deployed to similar environments from four military internists at the NATO Role 3, a combat hospital in Kandahar, Afghanistan, in 2013.

THE NATO ROLE 3 MULTINATIONAL MEDICAL UNIT

The NATO Role 3 Multinational Medical Unit (MMU) in Kandahar Air Field was first envisioned in 2005 and was supported by multiple countries to provide medical care for combat operations in southern Afghanistan (Fig. 1). Canada was initially the lead nation, then leadership was turned over to the U.S. Navy in 2009. It started as a plywood structure in the austere environment of Kandahar and was advanced to a state-of-the-art brick and mortar facility in May 2010. The Role 3 provided care not only to Americans, coalition forces, and multinational contractors but also to local Afghan nationals, including children, with a survival rate of 98% to 99% (2011 and 2012, respectively). When fully staffed, the Role 3 had about 250 staff members consisting of 30 physicians, with specialties ranging from trauma and general surgery, neurosurgery, oral maxillary facial surgery, orthopedics, ophthalmology, anesthesiology, emergency medicine, internal medicine, radiology, neurology, family medicine, and psychiatry. The Role 3 was supported with basic laboratory capabilities (blood bank, hematology, chemistry, urinalysis, limited microbiology) and radiology (X-ray, computed tomography scan, ultrasound).

On the basis of admissions data, 11,217 inpatients were admitted to the MMU from February 2006 to August 2013; most were male (92.4%) and the average age was 29 years (Table II). As shown in Figure 2, 49.7% of the admissions were battle injuries, and 20.5% required intensive care unit (ICU) admission; thus, slightly more than half of the admissions were nonbattle-related injuries/illnesses. With the scheduled withdrawal of U.S. military forces, the numbers of admissions continued to decrease as local Afghan military and hospitals increased their capabilities. Hospital staff and

*Operational Infectious Diseases Department, Naval Health Research Center, 140 Sylvester Road, San Diego, CA 92106.

†Walter Reed National Military Medical Center, 8901 Rockville Pike, Bethesda, MD 20889.

‡Naval Medical Center San Diego, 34800 Bob Wilson Drive, San Diego, CA 92134.

§96th Aerospace Medicine Squadron, 403 N Seventh Street, Eglin Air Force Base, FL 32542.

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TABLE I. The Five Echelons and Continuum of Medical Support and Care in Combat Settings

Echelons of Care	Setting/Location of Care/MTF	Level of Care and Available Resources
Role 1	Point of Injury Care Battalion Aid Station (USA) and Shock Trauma Platoon (USMC).	Basic First Aid to Include Self Aid, Buddy Aid, Combat Lifesaver, and Medic/Corpsman Care. Physician/Physician Assistant Care; No Surgical or Patient Holding Capacity.
Role 2	Medical Company Typically Supplemented With Surgical Assets, Strategically Located Throughout Theater of Operations: Forward Surgical Team (USA), Fleet Surgical Team (USN), Mobile Field Surgical Team (USAF), and Forward Resuscitative Surgical System (USMC).	Forward Resuscitative and Stabilization Surgical Care. 72 Hour Patient Holding Capacity, Basic Blood Transfusion, Radiography, and Laboratory Support.
Role 3	Combat Support Hospital (USN, USA), Air Force Theater Hospital (USAF), and Casualty Receiving Ships (USN).	Fixed Facilities With Full Inpatient Capacity, Intensive Care Units, and Operating Rooms; Allow For Additional Resuscitation and Surgical Treatment En Route to Higher Levels of Care. Definitive Surgery Is Provided to Local Nationals Who Will Stay in Country. Advanced Imaging, Laboratory, Apheresis, and Critical Care Resources Available.
Role 4	Regional Hospital (LRMC) or USNS Hospital ships (USN).	General and Specialized Inpatient Medical and Surgical Care, Providing Further Surgical Management.
Role 5	Military Care Facilities Within the United States, Usually Tertiary Care Medical Centers.	General and Specialized Inpatient Medical and Surgical Care, Including Long Term Rehabilitative Care.

Level, echelon, and role are considered equivalent terms. MTF, medical treatment facility; USA, U.S. Army; USN, U.S. Navy; USMC, U.S. Marine Corps; USAF, U.S. Air Force; USNS, U.S. Naval Ship.



FIGURE 1. Map of Afghanistan.

TABLE II. Patient Demographics From February 2006 to August 2013

Year	Total Admissions	Male (%)	Mean Age, Years (Range)	ICU (%)
2006	857	95.4	29.2 (0 70)	9.6
2007	749	96.4	26.1 (0 70)	17.2
2008	690	95.1	28.8 (3 60)	22.8
2009	611	95.1	28 (18 82)	20.6
2010	1362	92.4	N/A	24.9
2011	3447	92.0	26.9 (0 75)	20.0
2012	2439	91.3	31.3 (1 87)	20.7
2013	1062	87.8	32.8 (1 70)	25.0
Overall	11217	92.4	29.0 (0 87)	20.5

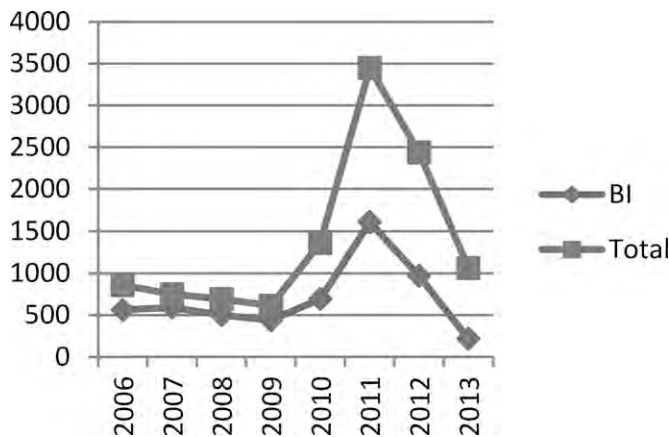


FIGURE 2. Total and battle related admissions from February 2006 to August 2013.

functions were also being reduced as the authors were leaving and preparing this article.

PREPARING TO BE A COMBAT INTERNIST

Before deployment, there were many general online courses to complete on topics ranging from introduction to Dari to hot weather injuries to counterinsurgency operations, medical and dental suitability screenings, and legal processes (to assign power of attorneys, make wills, etc). There was another week of processing, training, and uniform fitting/issue. Some of the surgical personnel received a monthlong intense trauma management experience at the Navy Trauma Training Center in Los Angeles, California. Because of the constant turnover and various “waves” of incoming and outgoing personnel, there was general medical training provided to certain rotating groups (not specialties or types of personnel), but not all.

The largest group of hospital staff were scheduled for a training evolution at the Naval Expeditionary Medical Training Institute in Camp Pendleton, California, but again, not all medical staff were included in this predeployment training (one of the four authors participated in this training). Before leaving for Afghanistan, there was “sand sailor” training for all navy deployers at various Army locations

for Navy Individual Augmentee Combat Training, which consisted of:

Weapons training: familiarization, maintenance, and safety of pistols, rifles, and crew-served heavy weapons. First aid topics: tactical combat casualty care and evacuation/transport of wounded.

General military training: Afghan culture/language awareness, operational stress, rules of engagement/force, and the Geneva Conventions.

Nuclear, biological, and chemical weapons.

Land navigation and communications: map reading and navigation, military communication formats, and radio operations.

Basic combat skills: convoy force protection, military operations in urban terrain, detainee search and handling, nonlethal weapons familiarization, direct and indirect fire, identification and reaction to improvised explosive devices, and familiarization with military vehicles (Humvee and Mine-Resistant Ambush Protected).

INTERNISTS—RESPONSIBILITIES, CHALLENGES, AND SOME INTERESTING CASES

Internists served in diverse ways during deployment. The primary mission of the NATO Role 3 MMU was to provide combat trauma support, so in addition to “traditional” care of medical patients, most internists led ad hoc trauma teams for mass casualties and were certified in advanced trauma life support. Caring for the young, mostly male, “healthy” population, including pediatric patients, was a unique contrast to the typical internal medicine patient population who are much older with multiple medications and comorbidities. Daily multidisciplinary rounds kept all staff members apprised of what was happening with each patient.² Language and cultural differences provided interesting challenges when caring for Afghan nationals and multinational contractors. Injured detainees were also brought to the Role 3 for care and they were often antagonistic, uncooperative, and under close watch by armed guards. In addition to clinical duties, local threats, frequent rocket attacks, and security concerns required that we carry loaded weapons and were constant reminders of being in a combat zone.³

Internists in the ICU

The Role 3’s ICU was an open-bay unit with a 12-bed capacity and state-of-the-art monitoring and mechanical ventilation capabilities. In addition to war traumas, there were significant medical illnesses, including acute myocardial infarctions, strokes, acute leukemia, Guillain Barre, Stevens Johnson syndrome, and many others.

Traumatic brain injury (TBI) has been described as the signature injury in Operation Iraqi Freedom and OEF and is one of the most common injuries treated in the Role 3 ICU⁴ requiring close coordination with the neurosurgeon. It was paramount that the intensivist understood the nuances of

intracranial pressure monitoring and when to initiate use of hyperosmolar agents (i.e., mannitol), antiepileptics (i.e., levetiracetam), and pharmacologic thromboprophylaxis (i.e., low molecular weight heparin).⁵ After stabilization, coalition troops were transferred to higher echelons of care. However, Afghan national patients were challenging because of limited local resources. There were difficult decisions regarding continuing care for severely injured patients, who would ultimately be transferred to local hospitals that could not care for them.

In addition to severe TBI, much of the critical care was posttrauma resuscitation and continuation of a massive transfusion protocol.⁶ As such, critical care included frequent monitoring of hemoglobin and coagulation parameters with administration of blood products in the appropriate ratios and close involvement with the surgical and anesthesia teams in cases where ongoing hemorrhaging was highly suspect. Bed-side ultrasound with hemodynamic echocardiogram was an important tool in combination with invasive arterial blood pressure monitoring for ongoing resuscitation.

With the rise in nutritional supplement use, it was no surprise that they were frequently used in the combat zone. Numerous patients were admitted with cardiac manifestations of using 1,3-dimethylamylamine (DMAA) (methylhexamine; a known vasoconstrictor) containing supplements or overdose of stimulants as an adjunct to exercise.⁷ Admissions ranged from simple chest pain evaluations to ST-elevation myocardial infarction requiring thrombolysis and medevac. There were two cases of young men who were brought to the ICU with ventricular fibrillation arrest following use of DMAA containing supplements. Both returned to sinus rhythm after out-of-hospital electrical defibrillation, but they arrived intubated and unresponsive. We performed therapeutic hypothermia using a combination of cold saline, ice packs and fans, and continuous esophageal temperature monitoring.⁸ The patients were on a vecuronium drip in addition to sedation and analgesia with propofol and midazolam. A protocol was developed that included careful monitoring of laboratory values to identify electrolyte disturbances and coagulopathies. These patients were actively cooled during transfer to LRMC. Follow-up discussions revealed that both patients had full neurologic recoveries.

There were other unique aspects of ICU care at the Role 3. Intensivists performed the first bedside percutaneous tracheostomies; previously, these procedures had been done in the operating room by surgeons. We had a very aggressive invasive catheter protocol in which any lines that were not placed in a sterile manner with full barrier precautions in either our operating room or ICU were removed and new catheters were placed within 24 to 48 hours, resulting in low central line infections.

Internists in the Intermediate Care Ward

The Intermediate Care Ward (ICW) consisted of 3 open wards and 3 semiprivate rooms with a total capacity of

35 beds. The semiprivate rooms were used for female patients, detainees, and those requiring infection control precautions. One room, which was behind a set of additional double doors, was the "isolation" room as there was no negative pressure room.¹ There were 2 interpreters available at all times to translate for Afghan patients. Internists in the ICW served as hospitalists, treating a variety of combat injuries and medical illnesses. The most common medical conditions included nephrolithiasis, cellulitis, pneumonia/pneumonitis, gastroenteritis, rhabdomyolysis, and mental health admission among many others. In the hot desert setting where summer temperatures persisted above 100 degrees for months, and long sleeve/pants uniform and battle gear were required for prolonged periods heat injuries and illnesses were frequently encountered. More than half of the patients were taking multiple work-out supplements and energy drinks, which likely contributed to these injuries.

There were no separate surgical wards, so we became adept at caring for postoperative patients and wound management. Common surgical patients were those who had multiple battle injuries requiring surgical debridement from improvised explosive devices blasts and gunshot wounds, fractures, eye injuries requiring enucleation, and TBI. Frequent noncombat postoperative admissions included appendectomies, perianal abscesses/fistulas, and other occupational or recreational injuries. Another unusual occurrence was food impactions (approximately 20 during our 6-month deployment) requiring evacuation from the smaller bases and endoscopic intervention.

Disposition of each patient was variable depending on the resources of the country of origin, type of illness or injury, anticipated length of recovery/rehabilitation, job description, expected leave date, and so on. Afghan patients often had prolonged stays on the wards, often for intravenous antibiotics and multiple surgeries (including reconstructive plastic surgeries).

Internists in the Clinic

The Referral Care Center was an ambulatory clinic that provided care for a full spectrum of services from primary care to specialty consultations, ranging from medication refills and minor orthopedic injuries to much more serious conditions requiring urgent admission to the ICU and medevac. Coalition patients were frequently brought to the Referral Care Center by their medical providers (who also functioned as interpreters) for consultation of complex conditions that could not be treated at their local clinics. Memorable patients include one presenting to the clinic with 2 weeks of malaise and lab findings consistent with >50% blast cells on peripheral smear, whereas another young patient presented with a cough and was found to have a 10-cm mediastinal mass on chest X-ray. Another patient presented with an inflammatory polyarthritis and was later diagnosed with rheumatoid arthritis. During our deployment, 3 women were found to

be in second trimester pregnancies. There were also local outbreaks of food-borne gastroenteritis with stool cultures showing various pathogens, including *Shigella*, *Salmonella*, *Yersinia*, and so on. Although confirmatory lab testing was not readily available, patients were empirically treated for Q fever and other infectious diseases, such as parasites, leishmaniasis, and so on. Respiratory complaints were also common because of inhalation of aerosolized sand and irritants and smoke from the local burn pits.

Internists in Aeromedical Evacuation

The U.S. Air Force (USAF) provided medevac of active duty personnel as well as some coalition and U.S. civilian personnel. A highly skilled team consisting of a critical care trained physician, nurse, and respiratory therapist was available for transport of patients with life-threatening conditions.⁹ These patients could arrive in Germany within 12 hours from the point of injury and in the United States within 24 hours of injury.

To facilitate movement of patients out of theater, the USAF Contingency Aeromedical Staging Facility (CASF) and Patient Movement Element (PME) were colocated with Navy personnel in the Role 3. USAF Contingency Aeromedical Staging Facility/Patient Movement Element nurses, medical technicians, and flight surgeons evaluated all patients who required medevac and ensured that patients were cleared for flight by a fixed-wing aircraft. The flight surgeon submitted all requests to the Joint Patient Movement Requirements Center in Al Udeid Air Base, Qatar, where the theater-validating flight surgeon renders the final stamp of approval for flight.

During our rotation, the senior clearing flight surgeon was an internist and while the primary mission focused on safe aeromedical evacuation, a strong internist's background was a tremendous asset to the Role 3 staff, providing input for unusual and complicated medical patients and assist with mass casualty events. In one instance, a patient had presented with a diffuse rash after autoinoculating himself from his smallpox vaccine. This condition is known as mild generalized vaccinia, a self-limited condition in immunocompetent patients. The physician on duty was unfamiliar with the condition; therefore, the patient was placed in full isolation, and cidofovir, an experimental drug available in the Strategic National Stockpile, was being considered for treatment. The flight surgeon/internist was familiar with autoinoculation and provided guidance, reassuring both patient and staff. The patient was safely returned to his unit with recommendations on standard precautions and further care of his vaccine site.

Education and Administration

There were many opportunities to train and educate colleagues through weekly Continuing Medical Education lectures, teach sick call screener courses (a comprehensive course training hospital corpsmen), and serve on hospital committees. In addition to the typical hospital committees,

there were interesting ones such as the Rabies Advisory Board, which was necessary in this rabies endemic country. There was also an opportunity to visit the local regional military hospital to better understand the local medical support and present current medical topics in the management of wound care and prevention of thromboembolic diseases.

CONCLUSIONS

Ideally, there would be a few lessons learned that could sum up the combat internist experiences, however, depending on the type of deployment setting, the available skill sets, the personalities and personal attitude will determine the individual experience. Although both the Naval Expeditionary Medical Training Institute and Navy Trauma Training Center were both courses that provided some predeployment "trauma hospital" training, it was not generally provided to all deployers. Therefore, having personal contact with prior deployers is crucial in adequately preparing physically, mentally, and emotionally for deployment. Internists have diverse roles in a deployed combat hospital, encompassing clinical care of the both the battle and nonbattle injuries, hospital administrative positions, and organizational functions. This article highlights some of the observations and experiences of internists at the Role 3 in Kandahar with the goal of preparing future internists and other deployers for similar roles and opportunities. This deployment was a rewarding experience and opportunity, allowing military internists to utilize and expand their skills in support of our military and our country.

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